(No Model.) 6 Sheets—Sheet 1.

E. E. ELDER & E. H. TAYLOR.

MACHINE FOR MAKING BUNGS, &c.

No. 569,555. Patented Oct. 13, 1896.

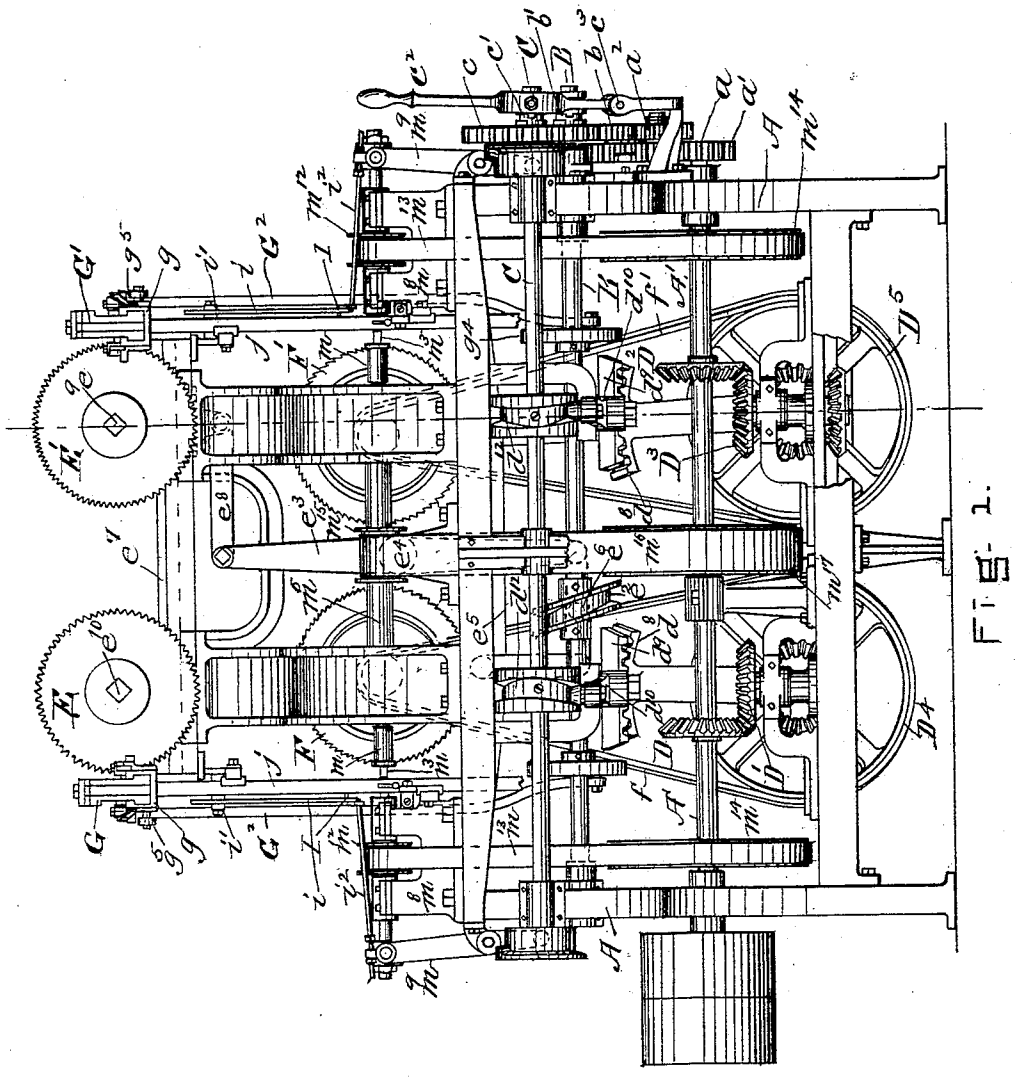

FIG. 1.

WITNESSES.

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(No Model.) 6 Sheets—Sheet 2.

E. E. ELDER & E. H. TAYLOR.

MACHINE FOR MAKING BUNGS, &c.

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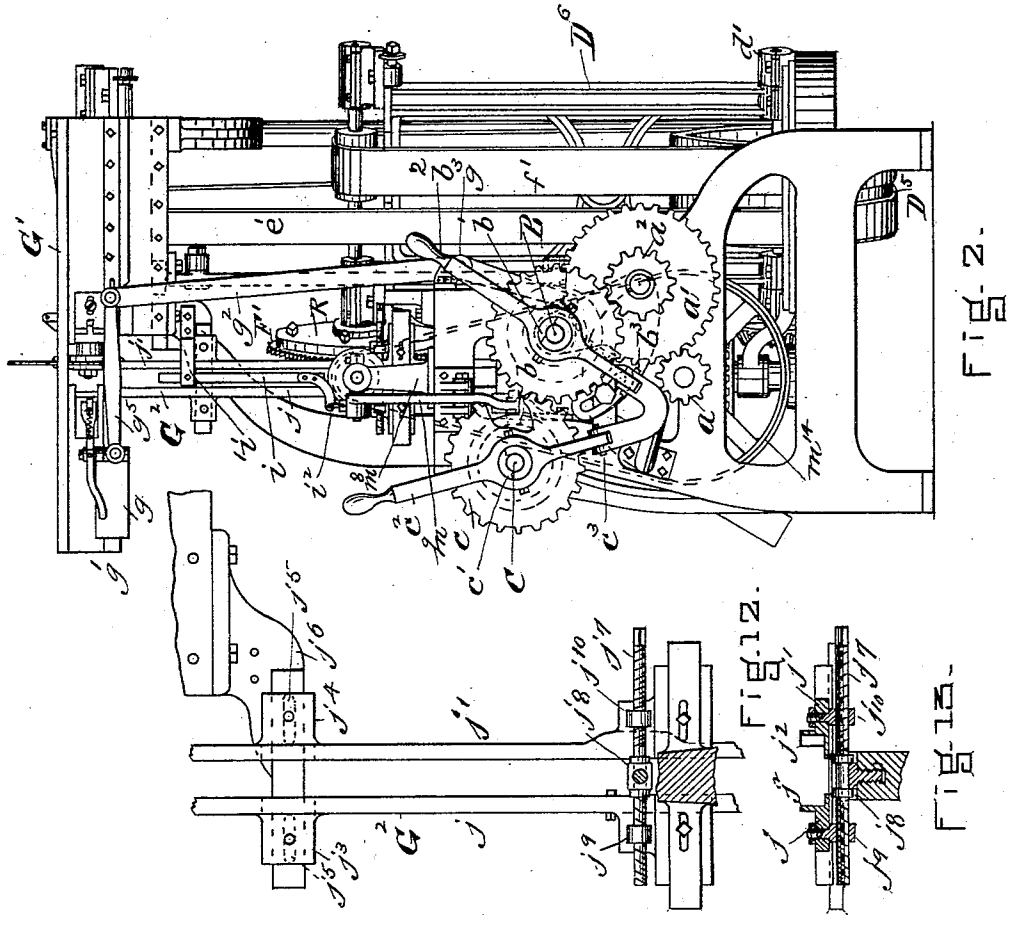

Fig. 2.

Fig. 12.

Fig. 13.

WITNESSES.

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(No Model.) 6 Sheets—Sheet 3.

E. E. ELDER & E. H. TAYLOR.

MACHINE FOR MAKING BUNGS, &c.

No. 569,555. Patented Oct. 13, 1896.

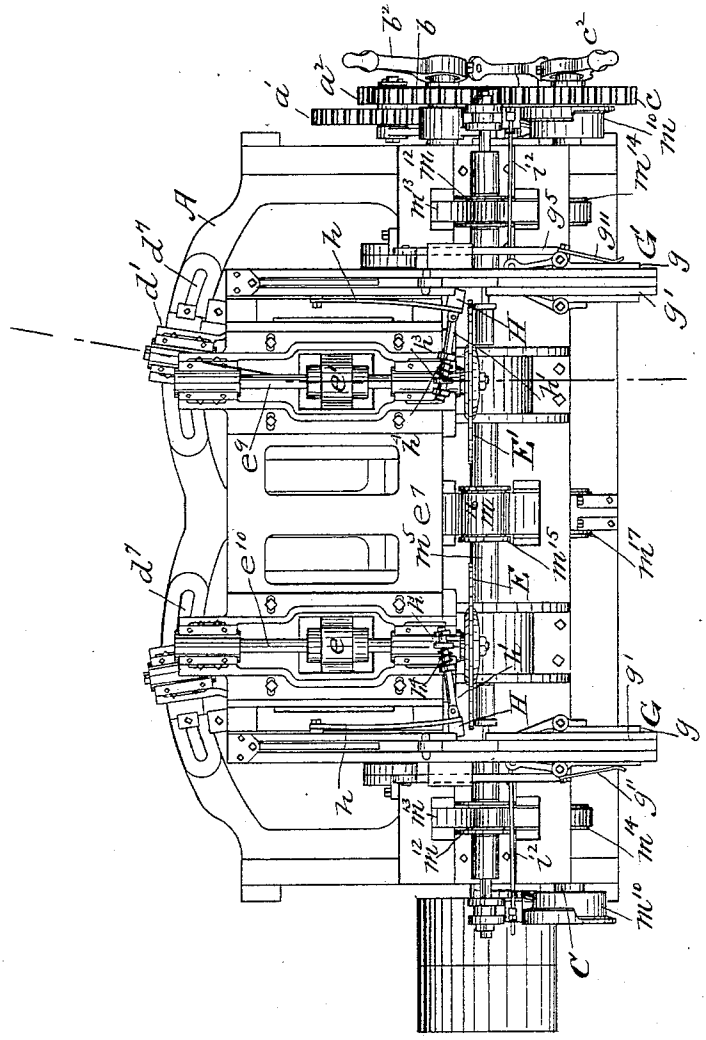

Fig. 3.

WITNESSES.
J. W. Dolan.
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(No Model.) 6 Sheets—Sheet 4.

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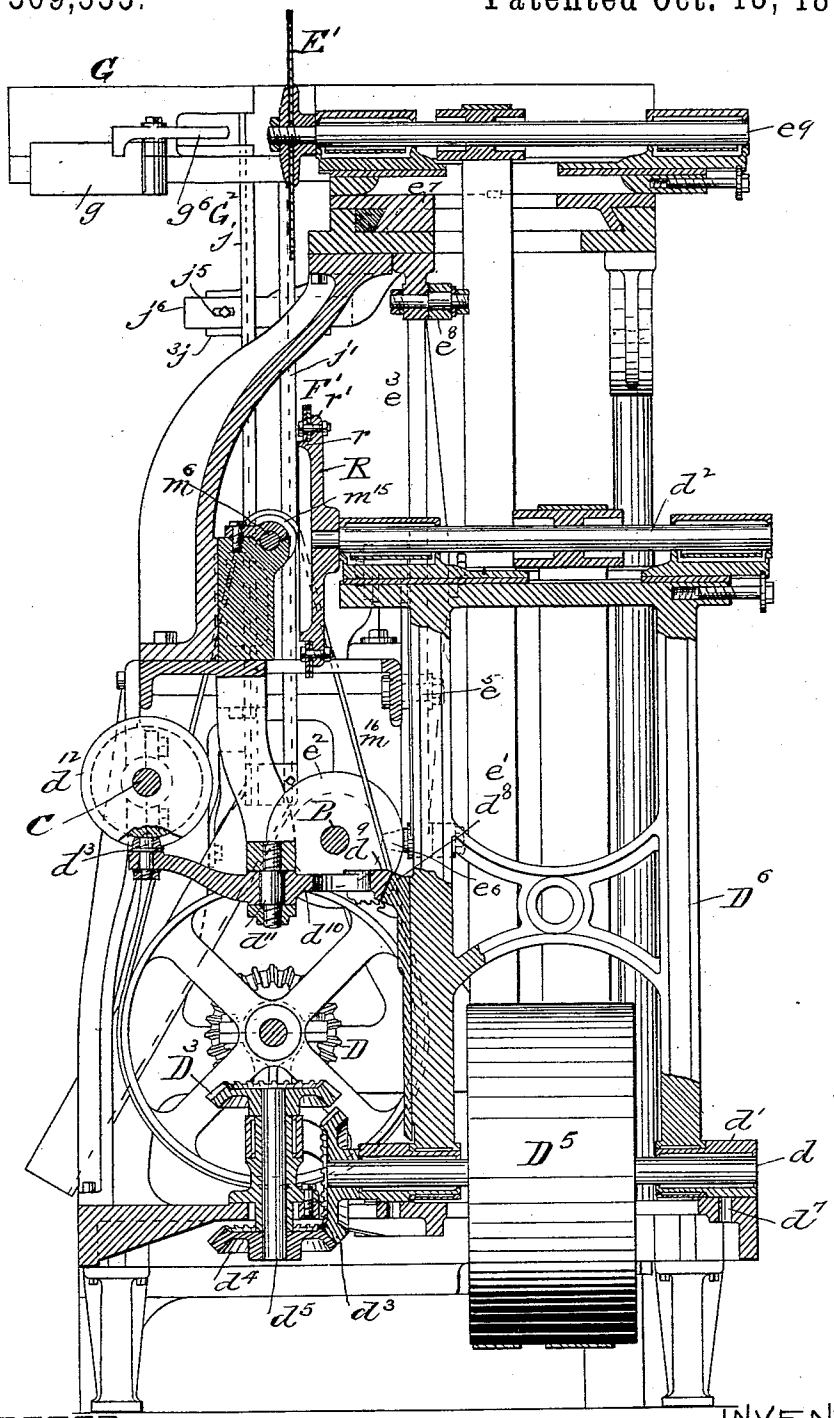
MACHINE FOR MAKING BUNGS, &c.

No. 569,555. Patented Oct. 13, 1896.



WITNESSES.

J. M. Dolan

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FIG. 4.

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(No Model.) 6 Sheets—Sheet 5.

E. E. ELDER & E. H. TAYLOR.

MACHINE FOR MAKING BUNGS, &c.

No. 569,555. Patented Oct. 13, 1896.

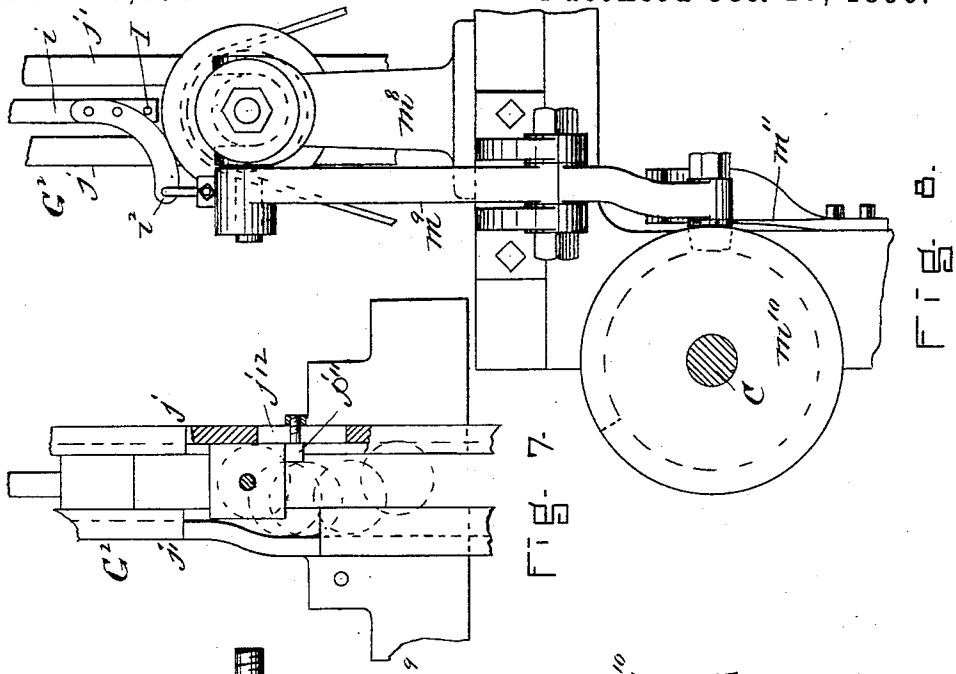

Fig. 8.

Fig. 7.

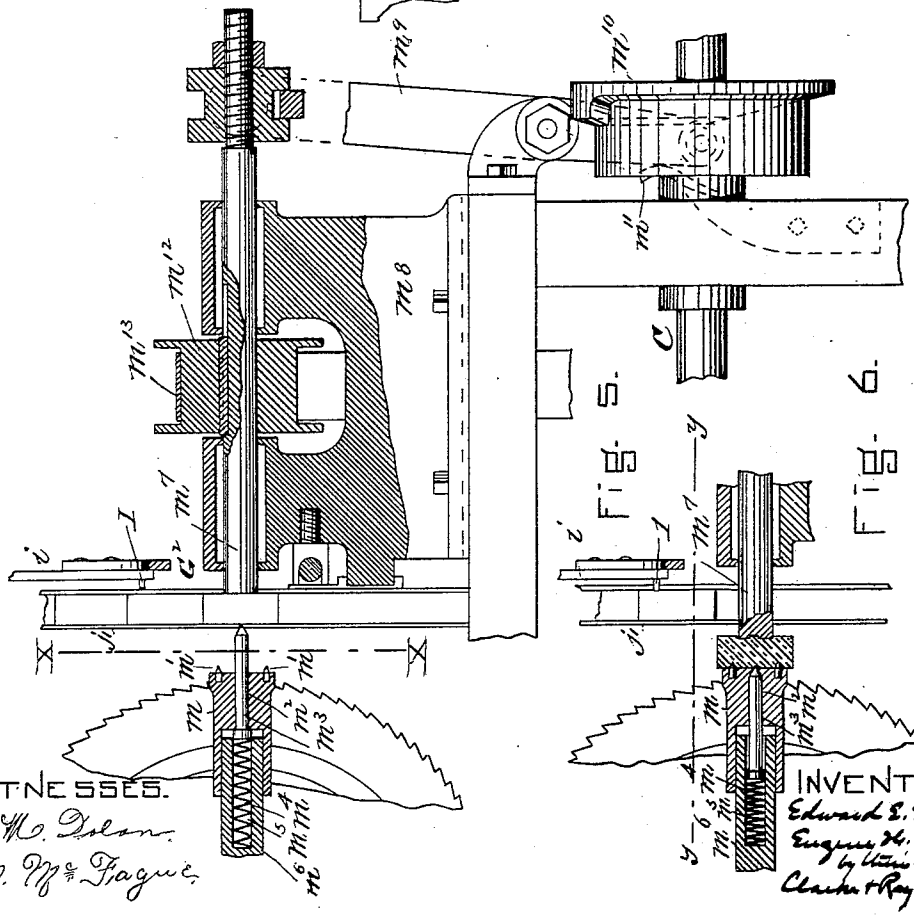

Fig. 5.

Fig. 6.

WITNESSES.

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by their Attys

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(No Model.) 6 Sheets—Sheet 6.

E. E. ELDER & E. H. TAYLOR.

MACHINE FOR MAKING BUNGS, &c.

No. 569,555. Patented Oct. 13, 1896.

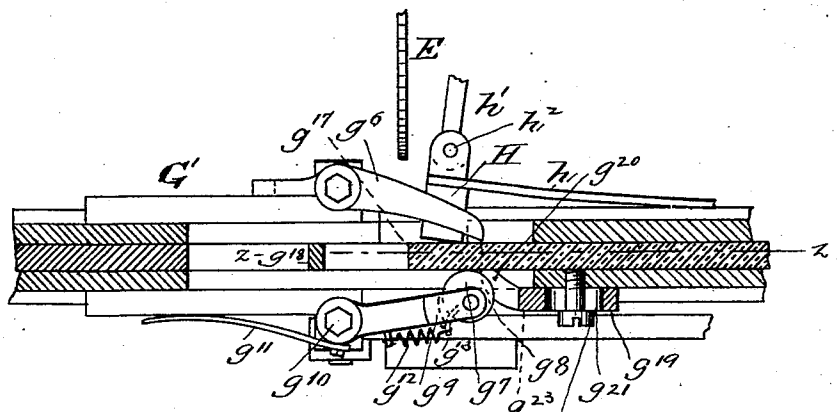

Fig. 10.

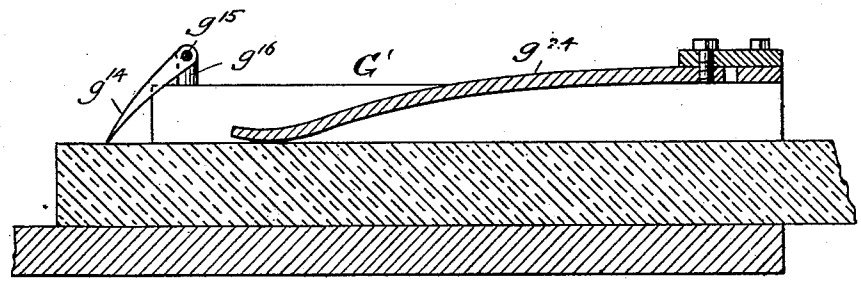

Fig. 11.

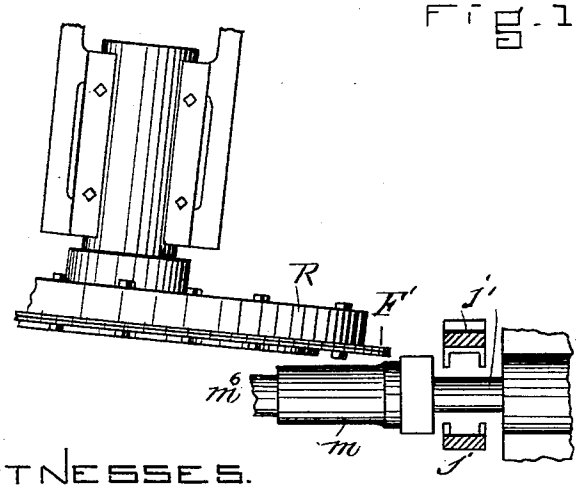

Fig. 9.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING BUNGS, &c.

SPECIFICATION forming part of Letters Patent No. 569,555, dated October 13, 1896.

Application filed October 26, 1891. Serial No. 409,815. (No model.)

To all whom it may concern:

Be it known that we, EDWARD E. ELDER and EUGENE H. TAYLOR, citizens of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Machines for Making Bungs and Similar Articles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention is an improvement upon that described in the application for Letters Patent of the United States filed July 13, 1889, Serial No. 317,392, and while it embodies in general many of the principles of the said invention the means by which they are carried into effect are in many instances very dissimilar from those described in the said application, and for this reason we shall describe the machine as a whole.

The machine is organized to cut from two long strips square bung-blanks and to feed the bung-blanks to the blank-turning devices, which are arranged and operated to work simultaneously upon two blanks. The mechanism for severing the blanks from the strip is adapted to be run independently of the mechanism for turning them, and likewise the mechanism for turning the blanks is adapted to be run without the blank-severing devices.

The invention varies from that described in the said application, among other things, in having a separate reciprocating saw or severing device for each strip-feed. This enables us to obtain a straight chute through which the blanks may be fed to the turning devices. The strip-feeding mechanism is of a different character. There is also employed means for ejecting automatically from the strip-feed-ways the waste ends of each strip. The turning devices are differently mounted and operated.

In the drawings, Figure 1 is a view of the machine in front elevation. Fig. 2 is a view in right side elevation. Fig. 3 is a plan view of the machine. Fig. 4 is a view in vertical section, enlarged, upon the dotted line of Fig. 3. Fig. 5 is a view in vertical section, enlarged, representing a portion of the blank grasping, presenting, and turning mechanism. Fig. 6 is a view representing many of the parts of Fig. 5, but in a different position, the blank having been transferred from the feeding-chute to a rotary clutch or head which holds it during the turning operation. Fig. 7 is a view in vertical section on the line $x\ x$ of Fig. 5. Fig. 8 is a view in end elevation of some of the parts shown in Fig. 5. Fig. 9 is a view in horizontal section on the line $y\ y$ of Fig. 6. Fig. 10 is a detail view in horizontal section on the line $w\ w$ of Fig. 2. Fig. 11 is a view in vertical section on the line $z\ z$ of Fig. 10. Fig. 12 is a view, enlarged, of a portion of the vertical chute to show the manner of adjusting the same. Fig. 13 is a view in horizontal section through the same on a line with the right and left screw.

A is the frame of the machine. It is built up of a number of parts, which need not be specifically enumerated.

A′ is the power-shaft. It has suitable bearings in the frame, and it communicates power to two principal cam-shafts B and C (see Figs. 1 and 2) by means of the pinion a at its right end, the gear a' (see Fig. 2) and pinion a^2 and gear b upon the shaft B, and gear c on the shaft C, the pinion a meshing with the gear a', the pinion a^2 meshing with the gear b, and the gear c meshing with the gear b and being of the same size. The gears $b\ c$ are free to turn upon their respective shafts B C, and each bears a member of a clutch. In connection with a sliding member of a clutch fast to the shaft which it is on rotation is given said shaft. The clutches are of ordinary construction and need not be particularly described.

In Figs. 1 and 2, b' denotes the position of the clutch of the cam-shaft B. The clutch is represented as operated by means of the lever b^2, pivoted at b^3 to a suitable support. The clutch for the cam-shaft C is located at c' (see Figs. 1 and 2) and is operated by a lever c^2, pivoted at c^3 to a suitable bracket. The power-shaft A′ also, by means of bevel-gearing D D′ and D^2 D^3, (see Figs. 1 and 4,) communicates power to the band-wheels D^4 D^5, respectively, which are connected, respectively, with the blank-severing saws E E′ by

means of the belts e e' (see Figs. 2, 3, and 4) and to the trimming saws or devices F F' by means of the belts f f'. Each band-wheel D^4 D^5 is mounted upon a shaft d, which is supported by an adjustable frame or carriage d', supporting at its upper end the shaft d^2 by means of a swinging frame D^6, which is journaled at its lower end to the adjustable carriage or base d'. This is to permit the upper end of the frame, the shaft, and the trimming saws or devices carried thereby to be reciprocated.

The shaft d is connected with its operating bevel-gear D' or D^3, as the case may be, by means of a bevel-gear d^3 (see Fig. 4) and bevel-gear d^4 at the lower end of the short shaft d^5, the upper end of the shaft carrying the bevel-gear D' or D^3. The carriage d' is adjustable horizontally upon an arc of which the shaft d^5 is the center, and it is accomplished by means of slots in the portion of the frame A of the machine upon which the carriages d' rest and suitable fastening-bolts. These slots d^6 d^7 are shown in Figs. 3 and 4, the outer one d^7 of course being longer than the inner one, and both being curved to describe arcs. By providing the carriage or base d' with this adjustment the angle of the shaft d^2 and of the turning saws or devices in relation to the center of the blank-holding chuck is varied, so that the saws may be moved upon a plane parallel with such center upon the adjustment of the carriage or base d' to that end, in which event a bung of uniform diameter throughout will be formed, or the frame and shaft may be set to any desired angle other than a right angle to the blank-holding chuck, in which event, upon the movement of the frame d', the turning devices or saws will take an angular movement in relation to the blank and form a tapering bung, the degree of taper varying with the extent of the angle. The reciprocating motions are imparted to the frame D^6, and consequently to the turning saws or devices, at desired times in the operation of the machine by means of the segment bevel-gear d^8 upon each of the frames D^6 (see Fig. 4) and the segment bevel-gear d^9 at the inner end of a lever d^{10}, pivoted to the frame by pivot-pin d^{11} and moved by the cylinder-cam d^{12} on the cam-shaft C, the lever having at its outer end a cam-pin d^{13} to enter the cam-groove of the cam.

It will be understood from what has been described of the construction of the machine that the cutting-saws E E' and the turning saws or devices F F', being connected directly with the power-shaft A', are continuously rotated, but that their other operative movements are dependent upon the rotation of the cam-shafts B C, the rotation of the cam-shaft C causing the frames carrying the rotating turning saws or devices to be reciprocated. The cutting-saws E E' are reciprocated by means of a cam e^2 upon the cam-shaft B, a lever e^3 having bearing-pivot e^4, (see Figs. 1, 3, and 4,) connected at its lower end with the cam e^2 by a link pivoted at e^5, and having a cam-pin e^6 to enter the cam-groove, and at its upper end with a slide e^7, upon which the cutting-saws E E' are mounted by means of a link e^8. The cam e^2 is timed to reciprocate the slide e^7 at desired intervals. The slide is suitably mounted upon an upper part of the frame A to slide thereon, and it has bearings for the shafts e^9 e^{10}, carrying the cutting-saws and the pulleys over which the belts e e' run. The shafts e^9 e^{10} and their boxes are laterally adjustable upon the carriage e^7 to vary the position of the saws E E', as it may be desired to vary the size of the blanks being cut. This adjustment may be obtained in any of the well-known ways.

It will be understood that the bung-blanks are cut from long strips of wood of the desired width and thickness, and that these strips are fed automatically to the cutting-saws E E' through suitable supporting-feedways. These feedways each have strip-feeding dogs and a waste-ejector, and they terminate over the vertical chutes through which the blanks drop or are transferred to the turning devices. G G' represent the relation which these feedways bear to the cutting-saws E E'. (See also Figs. 2, 3, 4, 10, and 11.) The strips are fed from the back side of the machine by means of a feeding device which lays hold of the inner end of each strip and draws it past the path upon which the cutting-saw is reciprocated to sever the blank from the strip end. The strip-box is made to provide a rectangular passage for the strip, the strip being held in it by the walls upon one edge. (See Figs. 10 and 11.) Each of the strip-feed devices comprises a carriage g, arranged to slide upon the support g', a reciprocating movement being imparted to it by means of the lever g^2, having pivot g^3, and reciprocated by a cam g^4 (see Fig. 1) upon the cam-shaft B. The upper end of the lever is connected with the slide g by a link g^5. (See Fig. 2.) This slide carries upon one side a fixed feed-dog g^6 (see Fig. 10) and upon the other side a feed-dog g^7, which is represented as a roll g^8, eccentrically mounted at the end of the arm g^9, pivoted at g^{10} to the slide. A spring g^{11} bears upon the arm and holds the roll in forcible contact with the side of the strip, while another spring, g^{12}, attached to the arm g^{13}, extending from the roll and to the arm g^9, serves to assist in turning the roll to its clamping position. In operation the forward movement of the dog does not serve to feed or move the strip, the roll then turning upon its eccentric center in a way to relieve its tension, the strip also being held against any tendency to move it backward by means of a detent-dog g^{14}, pivoted at its upper end at g^{15} to an arm g^{16} in a manner to drop into the feedway and rest upon the upper end of the strip, (see Fig. 11,) with its point opposed to a backward movement of the strip. Upon the feeding move-

ment of the slide and feed-dog the roll g^7 lays hold of the strip in conjunction with the dog g^6 with sufficient friction to draw it inward in the feedway until its inner end g^{17} comes in contact with the stop g^{18}. (See Fig. 10.)

It will be understood that the strip-feeding mechanism is provided with a uniform extent of throw or sufficient to feed the strip for the largest bungs to be made, and that it slips during its feeding movement or at the end of it after having fed the strip until its end comes into contact with the stop g^{18}. To eject the waste end of the strip from the feedway there is used an ejector-block H, (see Fig. 10,) which is mounted at the end of the spring-arm h, fastened to the side of one of the plates of the feedway. This block or its arm is also connected with the slide or carriage upon which the cutting-saw is mounted by means of the rod h', which is connected by pivot h^2 to the ejector-block or its support and extends through eyes or holes in the holders h^3, carried by the slide. A coiled spring h^4 surrounds the rod and serves, when the carriage is moved toward the feedway, to act against the rod and push the ejector across the feedway of the strip, thereby removing any remaining portion of the strip which is smaller than the bung-blank. It will be understood that while the strip is being fed the ejector is simply forced by the carriage against the side of the strip and that there is lost motion between the rod and the carriage which permits the movement of the carriage to take place without operating the ejector, the ejector operating only when there is little resistance in front of it, and then being operated by the action of the spring.

It will also be understood that the ejector is moved backward from the stop by the carriage-slide during the feeding movement of the strip, and that it is in operative position to eject only upon the forward movement of the carriage. The feedway is provided with an opening across it at this point to permit the waste to be moved from it laterally by the ejector. This opening must be of a size to permit the waste from largest-sized blanks to be pushed through it by the ejector, and to vary the size of the opening there is arranged upon the outside of the feedway an adjustable piece or plate g^{19}. (See Fig. 10.) This plate is shaped as represented in Fig. 10—that is, it has an inward-extending end g^{20}, which is in line with the inner surface of the feedway, and it has a slot g^{21}, through which the adjusting-screw g^{22} extends. The corner g^{23} may be beveled, if desired. This form is useful as a safety device as it permits the feed-roll to move upward and outward upon it in case it should by any accident or by design be moved inward sufficiently far to come within the path of the feed-dog.

To hold the strip down in the feedway there is used the flat spring g^{24}. (See Fig. 11.) At the end of the feeding movement of the strip the end of the strip is in contact with the stop g^{18} and over the entrance to the vertical chutes G^2. The cutting-saw is then reciprocated across the strip, severing from it a bung-blank, which then drops into the chute, it being to some extent forced into it by the action of the saw as it is withdrawn from the stock. The feed-chute G^2 is made in two sections $j\,j'$, which have the narrow flanges j^2, and together provide the end walls and short side walls for the chute, the chute being otherwise open. These sections $j\,j'$ of the chute are adjustable horizontally in relation to each other to vary the width of the passage according to the width of the blank which is being worked. This adjustment is represented as obtained by providing each of the sections $j\,j'$ with arms $j^3\,j^4$, respectively, which receive bolts working through adjusting-slots j^5 in the brackets j^6. The adjustment is further accomplished by means of a right and left threaded screw j^7, which is held at j^8 and engages nuts $j^9\,j^{10}$, which are carried by the sections $j\,j'$, respectively.

To adjust the size of the passage the holding-bolts are loosened and the right and left threaded screw is turned to move the sides in or out, as the case may be, and the bolts are then tightened and the sections of the chute locked in their new position. The lowermost blank in the chute drops upon the stop j^{11}, which extends into the chute, and is made vertically-adjustable upon the section j, the said section having the long vertical slot j^{12}, through which a stud forming the stop extends and which carries at its outer end a nut, by which it is clamped in any desired position. The undermost blank is free to fall upon the stop only when the turning-chuck is separated and open to receive it and after the turned blank has been formed and returned to the chute and dropped from the machine. This is accomplished by means of a blank-detent, which closes upon the second lower blank automatically and holds it during the presenting of the lowermost blank to the turning devices and until it has been finished, and the chuck is in a position to receive it when it is automatically released to fall between the two parts of the chuck and upon the stop. This detent is lettered I, and it is represented as a pointed stud extending inward from the lower end of the adjustable spring-arm i, the arm being held at its upper end by a bracket i' in a manner to permit it to be moved up or down. The spring is permitted to act and is withdrawn at the desired times by means of the lever, which operates one head of the chuck, and a connecting-rod i^2, the lever having lost motion upon the rod or moving it only during a portion of its outward movement.

The chuck or blank holding and rotating device is shown in detail in Figs. 5, 6, and 7. It comprises the stationary head m, having the spurs m', and the hole m^2, in which is a reciprocating throw-off rod m^3. This throw-off rod is backed by a spring m^4 in the hole

m^5 in the shaft m^6, and its normal position is that represented in Fig. 5. There is used in conjunction with the head m the movable tail-stock m^7. This is supported in suitable bearings in the stock or block m^8 and has an endwise horizontal movement in it, such movement being produced through the operation of the lever m^9 and the cam m^{10} upon the cam-shaft C and the spring m^{11}, the spring serving to force the tail-stock m^7 toward the head m, and the cam serving to remove it from said head or to a position represented in Fig. 5. A blank having fallen to the position represented in Fig. 5 between the tail-stock and the head is then, by the movement of the tail-stock, forced against the head m, at the same time moving inwardly the knock-off m^3, and at the same movement the blank-detent I is released and closed upon the second blank in order. (See Fig. 6.) Both the tail-stock m^7 and the head are rotated. The tail-stock is rotated by means of the pulley m^{12}, the belt m^{13}, and the band-wheel m^{14} upon the shaft A'.

It will be understood that where possible the same letters are used for the two sets of operating devices, and that the shaft m^5 is rotated by means of the pulley m^{15}, (see Fig. 1,) the belt m^{16}, and the band-wheel m^{17} on the power-shaft A'. It will therefore appear that the chucks are also in constant rotation with the cutting-saws and turning saws or devices, but are not otherwise operative until the cam-shaft which carries the cams which operate the levers m^9 is caused to be rotated.

We prefer to use as a bung-edge-shaping device two or more rotary saws, the saws decreasing slightly in diameter from the inner one or one nearest the back plate outwardly. These saws may be in the shape of ordinary circular saws or in the shape of what might be termed "saw-disks," that is, a circular saw from which the center has been removed, forming a very large aperture and a comparatively narrow blade. When saw-disks of this kind are employed, we prefer to mount them upon a holder R, preferably of cast-iron and very rigid and secured to the end of the shaft d^2. This holder has a shoulder r, extending from its face, of a size to fit the bore of the saw-disks and thus support the inner edges of the saws. It also has extending beyond or outward from the shoulder a reinforcing-section r', against which the disk or disks are firmly bolted, and by which they are firmly supported or held during their rotation. The saws as thus attached are securely held against the direct thrust and against any side thrust as they are being moved upon and across the bung-blank.

The operation of the machine is as follows: Power having been applied to the power-shaft A', and the cam-shafts B C being unclutched therefrom, the cutting-saws, the turning saws, and the chucks are caused to be rotated but not to be otherwise moved. The blank-forming strips are then fed into the feedways and the blank-severing devices are then started by engaging the shaft B with the gear b. This causes the feed-dogs to reciprocate in alternate order and the carriage or slide carrying the cutting-saws to be reciprocated, first, to move one saw to sever a blank from the end of one strip and then to remove it outward or away from the strip, and the other saw into operative relation with the other feedway and strip to sever a blank from it. This action is continued until the chutes G^2 are filled with blanks, when the cam-shaft C is connected with the power by means of its clutch. This causes the undermost blanks to be moved from the chutes, seized by the chucks, to be rotated, and the turning saws or devices F F' to be moved along their edges to shape them and to be returned to their original position, and the turned blanks to be then discharged into the chutes to fall finished from the machine. It will be understood that the chucking and turning operations proceed simultaneously upon two blanks.

It will be observed that the knock or throw off m^3 acts also in connection with the tail-stock of the chuck as a blank-carrier, in that it projects normally from the face-plate with which it is used sufficiently to bring its point upon a line or very nearly upon a line with the side of the chute upon which it is, and that as the blank drops into position between this pointed end of the throw-off and the tail-stock the movement of the tail-stock toward the head-stock first immediately brings the blank into contact with the pointed end of the throw-off, and the throw-off acts to hold the blank against the tail-stock while it yields to permit of the movement of the blank and tail-stock toward the head-stock, thus holding the blank while it is being transferred by the tail-stock from the chute to the head-stock.

It will also be noticed that the saw-holder R is so constructed that the saws do not extend to the center or shaft of the holder, there being a chamber or cavity upon the front of the holder. This construction of the holder in connection with the form of saw used upon it permits the saws to be moved closer to the chuck and a smaller blank to be turned than would be the case if the ordinary form of circular saw were used and attached directly to the shaft, as that construction would require a longer shaft and a holding-nut, which would be in the way or come into contact with the chuck or other portion of the machine and prevent the saws from being set up as closely as is desired.

By referring to Fig. 7 it will be seen that the stop j^{11} serves to hold a square blank between the plates of the chuck and until it has been engaged by them and the blank turned, but does not act to hold the turned blank after it has been returned to the chute, because the chute is widened upon the side opposite

the stop sufficiently to provide space between the end of the stop and its side for the passage downward of the completed bung.

The saws E E′ are adjustable horizontally upon their carriage (see Fig. 3) in order that they may be set up in regard to the feedways as they become worn. This adjustment is represented as effected by mounting the boxes of each saw-shaft upon a slide or support made adjustable by means of bolts and slots in relation to the carriage. (See Fig. 3.)

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine for making bungs, and similar articles, the combination of the main or actuating shaft A′, of the machine; the blank-severing saws E and E′, connected with and operated by such shaft; mechanism, substantially as specified, for moving the saw-carriage and saws forward and backward in relation to the bung-strip feedway of the machine; a clutch for connecting such mechanism to, and disconnecting it from the main shaft; and the saws F and F′, connected for rotation, as set forth, with the main shaft A′; substantially as and for the purposes described.

2. The combination in a machine for making bungs and similar articles, comprising a common main or power shaft, of the described duplex instrumentalities, the cam-shafts B and C, and clutches for independently connecting them with and disconnecting them from the main shaft of the machine; the strip-feedways G and G′; the blank-severing saws E and E′, connected with the main shaft of the machine for continuous rotation; the carriage e^7, upon which the saws E and E′ are mounted; a reciprocating strip-feeder for each of the feedways G, G′; a cam upon the cam-shaft B, connected with the carriage e^7, as described, to reciprocate it and its saws; a separate cam g^4, for independently actuating its respective blank-strip feed, mounted upon such shaft; the edge-shaping devices F, F′, and the chucks or blank-holders, connected with the main shaft, to be continuously rotated; a separate carriage for each edge-shaping device or bung-former; cams upon the cam-shaft C, connected with such separate carriages, for their reciprocation; and separate chuck-actuators, and separate cams upon the shaft C, for actuating them, or permitting them to be operated by springs; as and for the purposes set forth.

3. The combination in a machine for making bungs and the like, of a feedway along which a blank-forming strip is fed; a stop, at the end of such feedway; an opening across the feedway, in front of the stop; a reciprocating severing device, for cutting the strips into blanks; an ejector which is moved by such severing devices into contact with the side of the blank-strip; and a spring which is compressed by such movement, and thereby adapted to actuate the ejector to force the waste end of a blank-strip through such opening, when the waste end is smaller than the opening; substantially as and for the purposes described.

4. The combination in a machine for making bungs, and the like, of the blank-strip feedway; a stop, at the end of the feedway; an opening across the feedway, in front of the stop, through which the waste end of a strip is adapted to be ejected; an adjustable gate or plate for varying the size of the opening; and an ejector to remove the waste end of a strip from the feedway, automatically, when it is of less size than such cross-opening; as and for the purpose set forth.

5. The combination in a machine for making bungs and similar articles, of the described feedway; a stop, at the end of the feedway, against which the strip is fed; an opening through the sides of such feedway, near its inner end; a reciprocating cutter, to cross such feedway; and an ejector H, which is held at the end of a flexible arm, and which is connected with the carriage which carries the cutter, by a rod, substantially as specified, and a spring h^4; as and for the purpose described.

6. The combination in a machine for making bungs and the like, of the strip-feedway of the machine; the reciprocating draw-dog g^6; the reciprocating yielding draw-roll support g^9; and the roll g^8, eccentrically mounted in said arm; and its actuating-spring g^{12}; as and for the purpose described.

7. The combination in a machine for making bungs and the like; of the described strip-feedway; a stop, at the end of the feedway; the strip-drawers; the strip-detent and strip-holder; the adjustable plate g^{19}; the ejector H; and the blank-severing saw; substantially as described.

8. The combination of the main shaft of the machine; the cam-shafts C and B, and the train of gears connecting the same, comprising the pinion a, the intermediate gear a' and pinion a^2, the loose gear b on the shaft B, and the loose gear c upon the shaft C, each of which carries a member of a clutch, and a fast member of a clutch upon each shaft B, C, and a handle or lever for moving it into engagement with its rotary member; as and for the purposes specified.

9. The combination of the blank-strip feedway; the spring-arm h, secured by one extremity to the body of such feedway; the ejector-block H, upon the free end of the spring-arm h; and the rod h', pivoted to the ejector-block, connected with the slide or carriage, and encircled by the actuating-spring h^4; substantially as shown and described, and for the purposes specified.

10. The combination of the power-shaft A′, carrying gear-wheels as described; the short shaft d^5, and its gear-wheels; the horizontal shaft d, having inner terminal gear-wheel, and band-wheel, and carrying the adjustable carriage d' and swinging frame D^6; the horizontal shaft d^2, carrying trimming-saw and band-

wheel, and supported by the shaft d, and the frame D^6; and a connecting band or belt upon the two band-wheels; substantially as specified.

11. The combination of the rotary bung-edge-shaping device; its shaft d^2, and adjustable frame D^6, with the sector-gear d^8, attached to the frame; the sector-gear d^9, at the end of the lever d^{10}, to engage the sector-gear d^8; and the cam d^{12}, upon the shaft C; substantially as described.

EDWARD E. ELDER.
EUGENE H. TAYLOR.

In presence of—
F. F. RAYMOND, 2d.
J. M. DOLAN.